CLAIMS

1. A gelled composition comprising a polymer and a solvent, said polymer being obtained by an addition reaction between a linear copolymer having two terminal hydrosilyl groups and a compound having 3 or more ethylenic double bonds, wherein

said linear copolymer being formed by copolymerizing a compound represented by the formula (A):

(A)

where

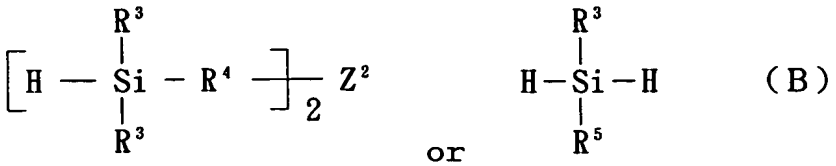
R^1 represents, independently of each other, a hydrogen atom, a substituted or unsubstituted alkyl group having 1 to 18 carbon atoms, or a substituted or unsubstituted aryl group having 6 to 20 carbon atoms;

R^2 represents, independently of each other, a substituted or unsubstituted alkylene group having 1 to 18 carbon atoms, a substituted or unsubstituted arylene group having 6 to 20 carbon atoms, a substituted or unsubstituted arylalkylene group having 7 to 21 carbon atoms, a dialkyl(poly)silylene group, a diaryl(poly)silylene group, or a bond; and

Z^1 represents a polyoxyalkylene group, a (poly)carbonate group, a (poly)ester group, an alkylene group having 1 to 36 carbon atoms, a hetero-atom-containing organic group having 1 to 6 hetero-atoms and 1 to 30 carbon

atoms, a divalent group derived from polyacrylate or polymethacrylate, or a bond;

and a compound represented by the formula (B):



(B)

where

R^3 represents, independently of each other, a substituted or unsubstituted alkyl group having 1 to 18 carbon atoms, a substituted or unsubstituted aralkyl group having 7 to 21 carbon atoms, or a substituted or unsubstituted aryl group having 6 to 20 carbon atoms;

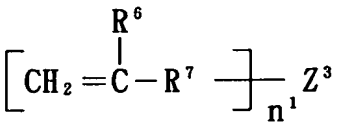
R^4 represents, independently of each other, a substituted or unsubstituted alkylene group having 1 to 18 carbon atoms, a substituted or unsubstituted arylene group having 6 to 20 carbon atoms, a substituted or unsubstituted arylalkylene group having 7 to 21 carbon atoms, a dialkyl(poly)silylene group, a diaryl(poly)silylene group, or a bond;

R^5 represents a substituted or unsubstituted alkyl group having 2 to 18 carbon atoms, a substituted or unsubstituted aralkyl group having 7 to 21 carbon atoms, or a substituted or unsubstituted aryl group having 6 to 20 carbon atoms; and

Z^2 represents a divalent linking group which is a disubstituted divalent silicon atom, a substituted or unsubstituted alkylene group having 1 to 18 carbon atoms, a substituted or unsubstituted arylene group having 6 to 20

carbon atoms, a hetero-atom-containing organic group having 1 to 6 hetero-atoms and 1 to 30 carbon atoms, a benzenepolycarboxyl group, a phosphate group, a polyoxyalkylene group, a (poly)carbonate group, a (poly)ester group, a group derived from polyacrylate or polymethacrylate, or a bond;

said compound having 3 or more ethylenic double bonds being a compound represented by the formula (D):



(D)

where

R^6 represents, independently of each other, a hydrogen atom, a substituted or unsubstituted alkyl group having 1 to 18 carbon atoms, or a substituted or unsubstituted aryl group having 6 to 20 carbon atoms;

R^7 represents, independently of each other, a substituted or unsubstituted alkylene group having 1 to 18 carbon atoms, a substituted or unsubstituted arylene group having 6 to 20 carbon atoms, a substituted or unsubstituted arylalkylene group having 7 to 21 carbon atoms, a hetero-atom-containing alkylene group having 1 to 6 hetero-atoms and 1 to 30 carbon atoms, or a bond;

n^1 denotes an integer of 3 or higher; and

Z^3 represents a linking group having the same valence number as n^1 which is a carbon atom, an alkynyl group having 1 to 18 carbon atoms, an alkanepolyyl group having 1 to 12 carbon atoms, a silicon atom, a

monosubstituted trivalent silicon atom, an aliphatic group having 1 to 300 carbon atoms, a hetero-atom-containing organic group having 1 to 50 hetero-atoms and 1 to 100 carbon atoms, a benzenepolycarboxyl group, a phosphate group, an oxyphosphate group, a group derived from (poly)carbonate, poly(ester), polyacrylate or polymethacrylate, or a bond; and

said addition reaction being carried out in the presence or absence of the compound represented by the formula (A) and/or the compound represented by the formula (B).

2. The composition according to claim 1, wherein said linear copolymer is reacted with the compound represented by the formula (D) in the absence of the compound represented by the formula (A) and the compound represented by the formula (B).

3. The composition according to claim 1, wherein said linear copolymer is reacted with the compound represented by the formula (D) in the presence of the compound represented by the formula (A) and in the absence of the compound represented by the formula (B).

4. The composition according to claim 1, wherein said linear copolymer is reacted with the compound represented by the formula (D) in the presence of the compound represented by the formula (B) and in the absence of the compound represented by the formula (A).

5. The composition according to claim 1, wherein said linear copolymer is reacted with the compound represented

by the formula (D) in the presence of both of the compound represented by the formula (A) and the compound represented by the formula (B).

6. A gelled composition comprising a polymer and a solvent, said polymer being obtained by a simultaneous addition reaction of the compound represented by the formula (A) according to claim 1, the compound represented by the formula (B) according to claim 1, and the compound represented by the formula (D) according to claim 1.

7. A gelled composition comprising a polymer and a solvent, said polymer being obtained by an addition reaction of the compound represented by the formula (B) and the compound represented by the formula (D) according to claim 1.

8. A gelled composition comprising a polymer and a solvent, said polymer being obtained by an addition reaction between a linear copolymer having two terminal ethylenic double bonds and a compound having 3 or more hydrosilyl groups, wherein

said linear copolymer being formed by copolymerizing a compound represented by the formula (A) according to claim 1 and a compound represented by the formula (B) according to claim 1;

said compound having 3 or more hydrosilyl groups represented by the formula (F):

$$\left[H_a \, Si(R^8)_{3-a} - R^9 \right]_{n^2} Z^4 \qquad (F)$$

where

R^8 represents, independently of each other, a substituted or unsubstituted alkyl group having 1 to 18 carbon atoms, or a substituted or unsubstituted aryl group having 6 to 20 carbon atoms;

R^9 represents, independently of each other, a substituted or unsubstituted alkylene group having 1 to 18 carbon atoms, a substituted or unsubstituted arylene group having 6 to 20 carbon atoms, a substituted or unsubstituted arylalkylene group having 7 to 21 carbon atoms, a hetero-atom-containing alkylene group having 1 to 6 hetero-atoms and 1 to 30 carbon atoms, or a bond;

Z^4 represents a linking group having the same valence number as n^2 which is a carbon atom, an alkynyl group having 1 to 18 carbon atoms, an alkanepolyyl group having 1 to 12 carbon atoms, a silicon atom, a monosubstituted trivalent silicon atom, an aliphatic group having 1 to 300 carbon atoms, a hetero-atom-containing organic group having 1 to 50 hetero-atoms and 1 to 100 carbon atoms, a benzenepolycarboxyl group, a phosphate group, an oxyphosphate group, a group derived from (poly)carbonate, poly(ester), polyacrylate or polymethacrylate, or a bond;

a represents, independently of each other, an integer of 1 to 3; and

n^2 denotes an integer of 1 to 30, provided that when n^2 is 1, R^9 represents a bond and Z^4 represents a hydrogen atom or has the same meaning as R^8, and that in any case, at least 3 hydrogen atoms bonded to the Si atom are present

in the molecule; and

said addition reaction being carried out in the presence or absence of the compound represented by the formula (A) and/or the compound represented by the formula (B).

9. The composition according to claim 8, wherein said linear copolymer is reacted with the compound represented by the formula (F) in the absence of the compound represented by the formula (A) and the compound represented by the formula (B).

10. The composition according to claim 8, wherein said linear copolymer is reacted with the compound represented by the formula (F) in the presence of the compound represented by the formula (A) and in the absence of the compound represented by the formula (B).

11. The composition according to claim 8, wherein said linear copolymer is reacted with the compound represented by the formula (F) in the presence of the compound represented by the formula (B) and in the absence of the compound represented by the formula (A).

12. The composition according to claim 8, wherein said linear copolymer is reacted with the compound represented by the formula (F) in the presence of both of the compound represented by the formula (A) and the compound represented by the formula (B).

13. A gelled composition comprising a polymer and a solvent, said polymer being obtained by an addition reaction of the compound represented by the formula (A)

according to claim 1 and the compound represented by the formula (F) according to claim 8.

14. The composition according to any one of claims 1 to 13, wherein the solvent is present in said composition in a amount of 50 to 99% by weight.

15. A gelled ionic conductive composition comprising the composition according to any one of claims 1 to 14 and an electrolyte.

16. The composition according to claim 15, wherein the electrolyte is already present when the composition according to any one of claims 1 to 14 is produced.

17. The composition according to claim 15 or 16 having storage modulus of 3,000 pascals or higher.

18. The composition according to any one of claims 15 to 17, further containing a modified silicone having a viscosity of 10,000 cP or less at 40°C.

19. The composition according to any one of claims 15 to 18 whose ionic conductivity at -20°C is not less than 50% of the ionic conductivity of an electrolytic solution consisting of the electrolyte and the solvent.

20. The composition according to any one of claims 15 to 19, further containing a thermoplastic resin in the form of particles, fibers or a porous film.

21. A battery comprising the gelled ionic conductive composition according to any one of claims 15 to 20.

22. An electrochemical device comprising the gelled ionic conductive composition according to any one of claims 15 to 20.

23. The electrochemical device according to claim 22, which is a solar cell, a capacitor, a sensor, or an electrochromic display device.

24. The electrochemical device according to claim 23, which is a capacitor containing the gelled ionic conductive composition as an electrolyte layer.

25. A method for producing a battery or an electrochemical device comprising a gelled ionic conductive composition, comprising:

preparing an enclosure of the battery or the electrochemical device;

preparing an ionic conductive composition comprising a linear copolymer having 2 terminal hydrosilyl groups obtained by an addition reaction between a compound represented by the formula (A) according to claim 1 and a compound represented by the formula (B) according to claim 1; a compound represented by the formula (D) according to claim 1; a solvent; and an electrolyte;

pouring the ionic conductive composition into the enclosure; and

polymerizing or crosslinking the ionic conductive composition in the enclosure to form the gelled ionic conductive composition.

26. A method for producing a battery or an electrochemical device comprising a gelled ionic conductive composition, comprising:

preparing an enclosure of the battery or the electrochemical device;

preparing an ionic conductive composition comprising a compound represented by the formula (B) according to claim 1, a compound represented by the formula (D) according to claim 1, a solvent, and an electrolyte;

pouring the ionic conductive composition into the enclosure; and

polymerizing or crosslinking the ionic conductive composition in the enclosure to form the gelled ionic conductive composition.

27. A method for producing a battery or an electrochemical device comprising a gelled ionic conductive composition, comprising:

preparing an enclosure of the battery or the electrochemical device;

preparing an ionic conductive composition comprising a linear copolymer having two terminal ethylenic double bonds obtained by an addition reaction between a compound represented by the formula (A) according to claim 1 and a compound represented by the formula (B) according to claim 1; a compound represented by the formula (F) according to claim 8; a solvent; and an electrolyte;

pouring the ionic conductive composition into the enclosure; and

polymerizing or crosslinking the ionic conductive composition in the enclosure to form the gelled ionic conductive composition.

28. A method for producing a battery or an electrochemical device comprising a gelled ionic conductive

composition, comprising:

preparing an enclosure of the battery or the electrochemical device;

preparing an ionic conductive composition comprising a compound represented by the formula (A) according to claim 1, a compound represented by the formula (F) according to claim 8, a solvent, and an electrolyte;

pouring the ionic conductive composition into the enclosure; and

polymerizing or crosslinking the ionic conductive composition in the enclosure to form the gelled ionic conductive composition.

29. The method according to any one of claims 25 to 28, wherein a viscosity at 25°C of the ionic conductive composition is 30 mPa·s or less immediately after preparation of the ionic conductive composition, and an increase of the viscosity after a lapse of 6 hours at 25°C is within 300% compared with the viscosity immediately after the preparation.

30. The method according to claim 29, wherein the ionic conductive composition further comprises a polymerization inhibitor.